

PENDING CLAIMS

Claims 14-39 and 46-64 were pending in the application at the time of the Office Action; Claims 19, 24-26, 32, 37-39, 50, 57 and 62-64 represent non-elected claims withdrawn from consideration; the other ones of the pending claims were under consideration and subject to examination in the Office Action. Appropriate claims have been amended in order to correct dependencies. That is, such changes are unrelated to any prior art or scope adjustment and are simply correction of erroneous dependencies in Applicant's claims. At entry of this paper, the same numbered claims will be pending for further consideration and examination in the application.

CORRECTED FORMAL DRAWINGS

Although no claims are indicated to be allowable in the 19 December 2002 Action, as indicated by Applicant in the 3 October 2002 Amendment, attached hereto are four (4) sheets of formal drawings which incorporate the corrections as proposed in the 3 October Amendment and as approved by the Examiner.

Entry of the attached formal drawings is respectfully requested.

REJECTION UNDER §112, 2ND ¶ - OBVIATED VIA CLAIM AMENDMENT

Claims 53-64 were rejected under 35 USC §112, second paragraph, as being indefinite for the concerns listed at Item 3 on page 2 of the Office Action. Claims 53-64 have been carefully reviewed and carefully amended where appropriate in order to correct dependencies stemming from independent claim 52, thus to address the concerns listed in the Office Action. As the foregoing is believed to address all

§112 second paragraph concerns, reconsideration and withdrawal of the §112 second paragraph rejection are respectfully requested.

REJECTION UNDER 35 USC §103

The 35 USC §103 rejection of Claims 14-18, 20-23, 27-31, 33-36, 46-49, 51-56 and 58-61 as being unpatentable over Lim *et al.* (US 6,020,221) in view of Ho '890 (US 6,287,890 B1) is respectfully traversed.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated herein by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following.

As mentioned previously within Applicant's 3 October 2002 Amendment, Applicant's disclosed and claimed invention is directed to inventions concerning "thin-core" or "coreless" semiconductor packaging arrangements. As further mentioned previously within Applicant's 3 October 2002 Amendment, thin-core and/or coreless packaging arrangements are emerging (new) technologies being worked on heavily by the Assignee of the present application, and the terms "thin-core" and "coreless" are directed to very specific (new) packaging technologies. Ones of Applicant's claims, e.g., independent claim 14, recite the feature/limitations of a "package having one of a thin-core and coreless substrate." Applicant's specification page 6, line 20, describes a thick (normal) substrate core as

"0.7-0.8mm in thickness," and in contrast, Applicant's specification at page 8, line 11, describes a thin-core substrate core as "0.1-0.5, and more specifically, 0.4 mm" in thickness. Of course, a coreless substrate would not have a core substrate.

Turning now to rebuttal of the applied references, as mentioned previously within Applicant's 3 October 2002 Amendment, *Lim et al.* appears directed to a standard cored arrangement, and nowhere does *Lim et al.* mention "thin-core" or "coreless" substrate. The present Office Action attempts to support the rejection by stating (page 3), "[t]hough, *Lim* does not disclose explicitly whether the substrate is coreless or thin core, *Lim* discloses that the substrate can be made of any known material including polyamide tape, column 5, lines 55-60, and the polyamide tape will be inherently a thin substrate." Traversal is appropriate because *Lim et al.*'s disclosure of polyamide tape includes no further disclosure as to exactly how thick is such tape. It is respectfully submitted that tape can be manufactured to have an endless variety of thicknesses (even for a single product such as polyamide tape). It is respectfully submitted that it cannot be assumed, for *Lim et al.*'s vague disclosure of "polyamide tape," that such tape is of a thickness matching that of a "thin-core" or "coreless" substrate. Such an interpretation would not be gained by *Lim et al.*'s disclosure itself, but instead would be gained by improperly applying hindsight knowledge from Applicant's present disclosure.

Turning next to rebuttal of the secondary Ho '890 reference, it is respectfully submitted that such reference is not relevant, in that Ho '890 contains a thick (normal) substrate core 14 (FIG. 1). More particularly, numerous locations within Ho '890 (e.g., column 4, lines 48-53; and column 6, lines 21-25) make it abundantly clear that substrate 14 of Ho '890 is an initial core upon which all other multi-layers

are built. Related patent Ho '279 (U.S. Patent 6,242,279 B1) which has overlapping drawings from Ho '890, makes it clearer that Ho's substrate 14 is a core, as Ho '297's substrate 14 does not have windows etched all the way through the substrate 14.

Column 6, lines 56-58 of Ho '890 states that the substrate core 14 is "between about 30 to 40 mils thick," and converting this means the Ho '890 substrate core 14 is between 0.762mm and 1.016mm. Applicant's specification describes a thick (normal) substrate core as "0.7-0.8mm in thickness," and a thin-core substrate core as "0.1-0.5, and more specifically, 0.4 mm" in thickness. Accordingly, it can be seen that the substrate core 14 of Ho '890 represents a thick (normal) substrate core.

In concluding, given the fact that Lim *et al.* appears to be directed to a thick (normal) substrate core, as it contains no disclosure concerning the "thin-core" or "coreless" technologies, and given the further fact that Ho '890 also is concerned with a thick substrate core, it is respectfully submitted that Lim *et al.* and Ho '890, taken alone or in combination, would not have disclosed or suggested Applicant's "thin-core" or "coreless" combination invention.

As a result of all of the foregoing, it is respectfully submitted that the applied art (taken alone and in the Office Action combinations) would not support a §103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such §103 rejection, and express written allowance of all of the §103 rejected claims, are respectfully requested. Further, at this point, it is respectfully submitted as a reminder that, if new art is now cited against any of Applicant's unamended claims, then it would not be proper to make a next action final.

EXTENSIVE PROSECUTION NOTED

Applicant and the undersigned respectfully note the extensive prosecution which has been conducted to date with the present application, and thus Applicant and the undersigned would gratefully appreciate any considerations or guidance from the Examiner to help move the present application quickly to allowance.

ENTRY AFTER FINAL REJECTION

For all of the foregoing reasons, Applicant submits that the present paper should be entered since it places the rejected claims in condition for allowance by complying with the Examiner's requirements and/or amending and/or arguing the claims to distinguish such claims from the applied prior art.

Alternatively, this response should be entered since it presents the rejected claims in better form for consideration on appeal.

EXAMINER INVITED TO TELEPHONE

The Examiner is invited to telephone the undersigned at the local D.C. area number of 703-312-6600, to discuss an Examiner's Amendment or other suggested action for accelerating prosecution and moving the present application to allowance.

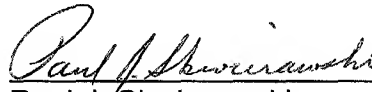
MARKED VERSION TO SHOW CHANGES MADE

Attached hereto is "Appendix A-Marked Version" showing the amendments made herein to the claims by underlining and brackets to indicate additions and deletions, respectively.

CONCLUSION

This Amendment is being submitted within the shortened statutory period for response set by the Office Action, and therefore, no Petition or fee is required. To whatever other extent is actually necessary, Applicant respectfully petitions the Commissioner for an appropriate extension under §1.136. Please charge any shortage in the fees due in connection with the filing of this paper to ATS&K Deposit Account No. 01-2135 (as Case No. 219.40241X00).

Respectfully submitted,



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ATTACHMENTS:

Appendix A-Marked Version
Four (4) Sheets FORMAL Drawings
for Figures 1-17

APPENDIX A-MARKED VERSION

IN THE CLAIMS:

Please enter the following clarified Claims 53-64.

53.(Once Amended) An electronic system as claimed in claim [27] 52, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

54.(Once Amended) An electronic system as claimed in claim [27] 52, where the stiffener is substantially made of at least one of a metal, plastic, glass and ceramic material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

55.(Once Amended) An electronic system as claimed in claim [27] 52, the stiffener being planar and mounted to a die-side major planar surface of the substrate.

56.(Once Amended) An electronic system as claimed in claim [27] 52, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

57.(Once Amended) An electronic system as claimed in claim [27] 52, the stiffener being a multi-part stiffener.

58.(Once Amended) An electronic system as claimed in claim [27] 52, the stiffener having an above-substrate-plane height, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

59.(Once Amended) An electronic system as claimed in claim [27] 52, the stiffener having a top surface above a substrate-plane, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

60.(Once Amended) An electronic system as claimed in claim [34] 59, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

61.(Once Amended) An electronic system as claimed in claim [27] 52, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener-opposing areas of the substrate.

62.(Once Amended) An electronic system as claimed in claim [27] 52, the stiffener being an edge stiffener mounted to minor-planar side-surfaces of the substrate.

63.(Once Amended) An electronic system as claimed in claim [27] 52, the edge stiffener having a non-flat cross section which is mated with the side-surfaces of the substrate.

64.(Once Amended) An electronic system as claimed in claim [27] 52, where the edge stiffener is pre-attached to the substrate by an IC-PCB carrier package manufacturer.